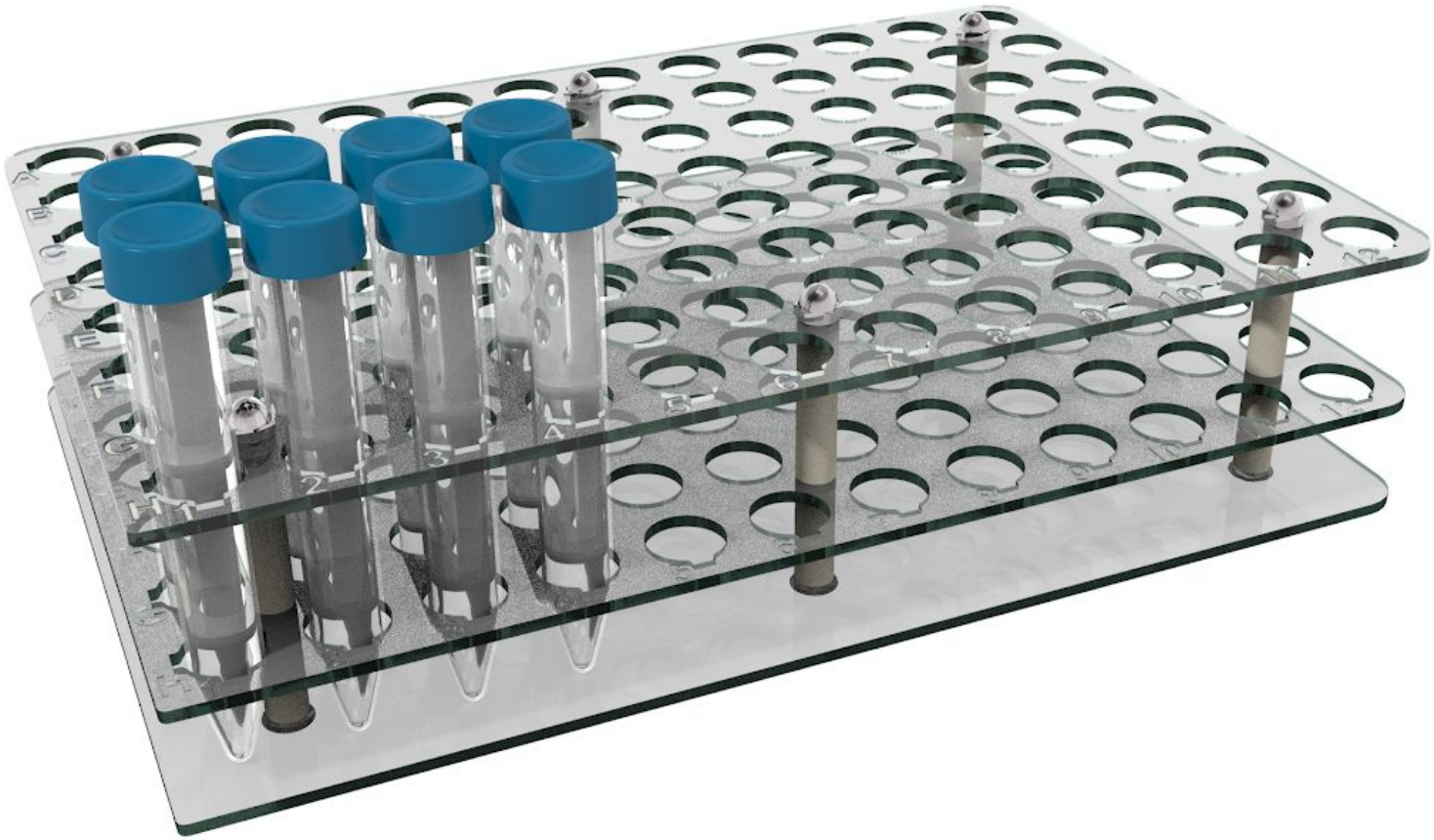
96-Place 16-17mm Acrylic Test Tube Rack

Assembly Instructions

July 17, 2020



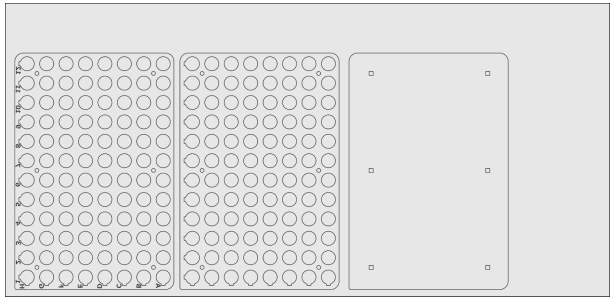
Questions? Contact Aaron Beckman | aaronpbeckman@gmail.com | (612) 505-4239

1. Parts List

Before starting, ensure that you have the following materials. **Quantities are listed for 1 rack and 50 racks (in parentheses), as the laser cut acrylic will likely be arriving in batches of 50 or more.**

Qty 1 *(50)* **Laser Cut Profile Sheet**

This is the main body of the tube rack. They will arrive in sheets with 3 profiles; **one sheet makes a full rack.** It should resemble this:

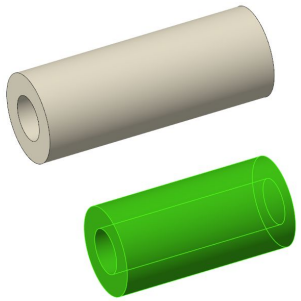


Qty 6 *(300)* **3” #10-24 Carriage Bolts**

Qty 6 *(300)* **#10-24 Cap Nuts**

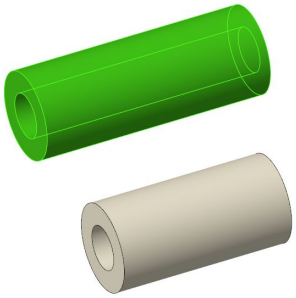
Qty 12 *(600)* **#10 Spacers *(0.75”)***

(Highlighted in green to differentiate lengths)



Qty 6 *(300)* **#10 Spacers *(1”)***

(Highlighted in green to differentiate lengths)



TOOLS

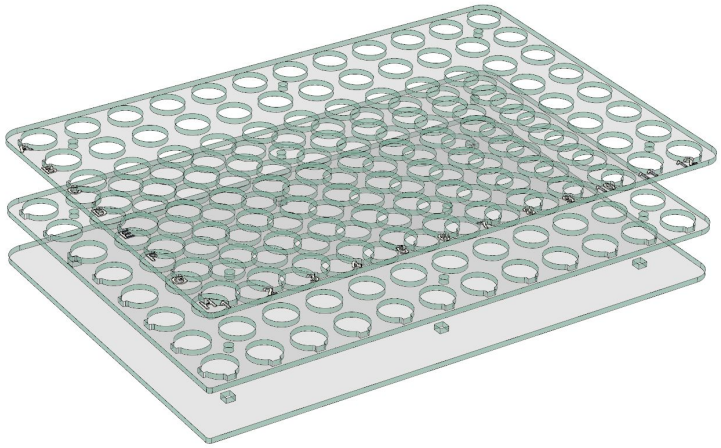
To assemble these, a ⅜” wrench or socket wrench is required. Multiple are recommended for faster assembly.

A box cutter (or other safe, thin blade) is useful to speed up removal of the protective coating on the acrylic sheets.

Patience and a steady hand is recommended, but optional.

Questions? Contact Aaron Beckman | aaronpbeckman@gmail.com | (612) 505-4239

2. Acrylic Sheet Preparation

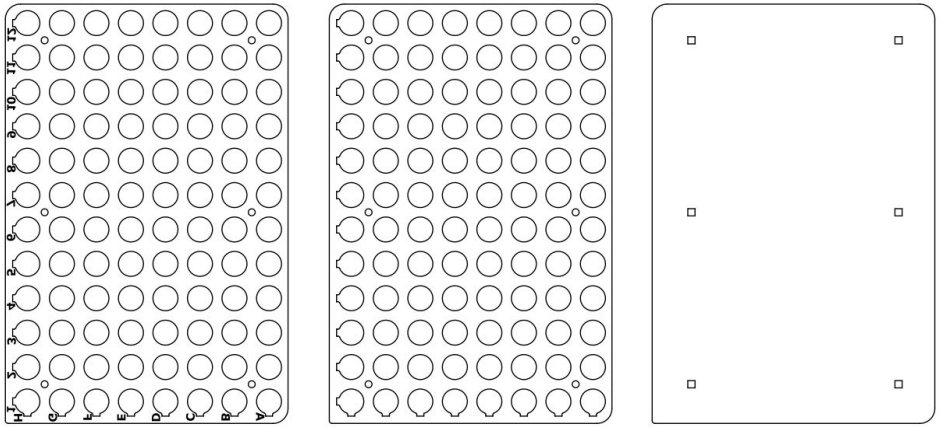


The laser cut sheets will arrive with a paper protective coating on both sides, and an additional adhesive coating on one side. First, remove the (potentially blue colored?) tape holding the whole sheet together. *Remember, only the 3 main rectangular profiles are required (shown on right). The "off-cuts" should be set aside for disposal* (the large outer part and all the small circles inside). These cannot be recycled with standard recycling services, but there may be some special services that can recycle acrylic (which is recommended as there will be a lot of waste from these parts).

To remove the protective paper coating, follow the steps on the video link or QR code on the right.

The video demonstrates a fast process for removal of the paper coatings, which is otherwise a very tedious process, even for just a few sheets. **Organize these in 3-sheet stacks once finished. There should be one of each sheet shown below**

HOLES + LABELS | **HOLES** | **BASE**

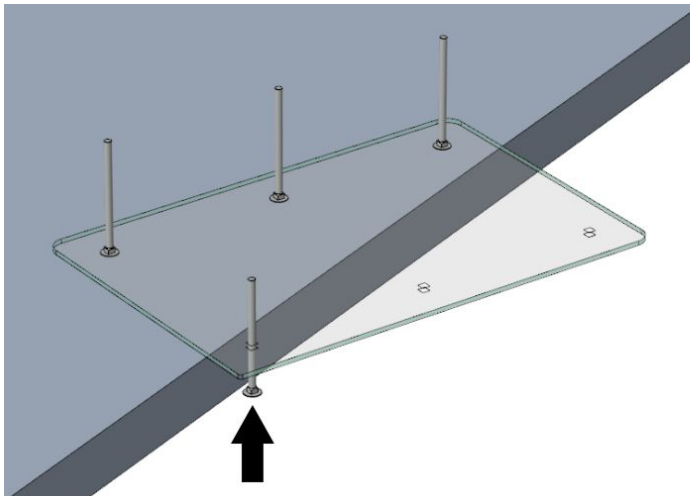


https://youtu.be/8Ke5vbl90OE

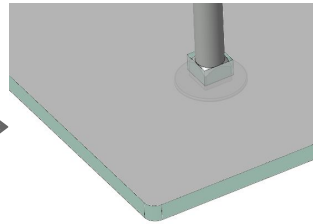
3. Main Assembly

Once parts are organized, assembly is only a few steps. Sheets are labeled as **HOLES + LABELS** | **HOLES** | **BASE** like the previous page.

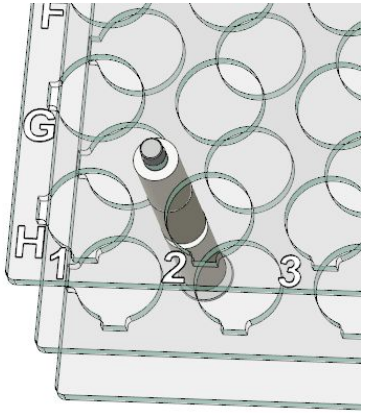
1. Put the 6 bolts into the **BASE** sheet. As the bolts need to be standing upright for step 2, an easy way to do this is to put bolts in the holes from the bottom one at a time with the sheet off the side of a table/surface, sliding that part of the sheet onto the supporting table/surface once the bolt is in place. **Note: make sure to align the square part underneath the head of the bolt with the square in the BASE sheet!**



A bolt properly installed in the **BASE** sheet →



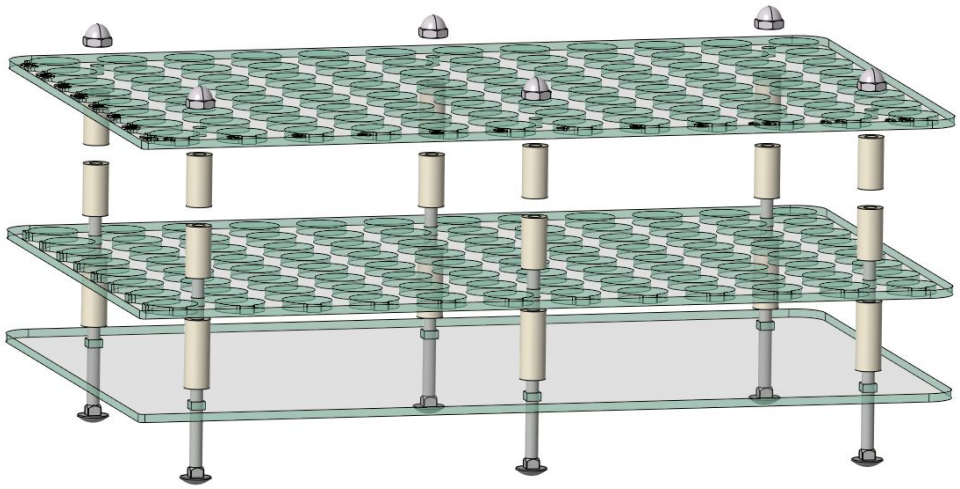
2. Put one **1”** spacer on each bolt, followed by the **HOLES** sheet, with the “sharp” corner lined up with the sharp corner on the **BASE** sheet. Remember, this sheet does **not** have any engraved numbers/letters on it, as it’s more difficult to see than the top sheet.
3. Put *two* **0.75”** spacers on each bolt, followed by the **HOLES + LABELS** sheet. The bottom left corner is the “sharp” one, with the engravings readable from the top. It should look like **this image →**



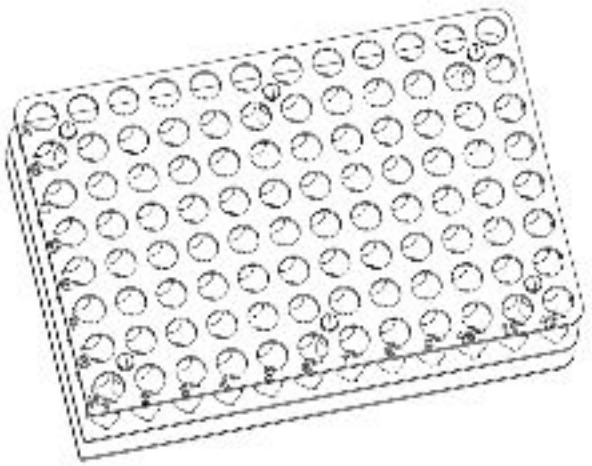
4. Finally, screw a cap nut onto each bolt. **Note: the bolt is held from the bottom square part, meaning any excessive torque may cause the base acrylic to fracture.** To avoid this, screw each one on by hand (without tightening), and tighten *carefully* with a ⅜” wrench/socket wrench. I’m not able to give exact values, but just use your discretion when tightening. The acrylic can take a surprising amount of torque and be OK based on our revision 1 prototype test.

4. Final Checks

Several different drawings are provided to ensure the final racks match the original design. Use these to verify the orientation, and then the racks are complete!



This is an open source project; while assembling, please take photos of the process *and* the final set of 50 racks and email/share them to aaronpbeckman@gmail.com. This will help me document my projects and fix potential issues that may arise. Thanks!



Cable tie cut outs are placed on the bottom row and left column of tube cut-outs. They've been included in case the engraved letters are too difficult to see, but please consider the fact that tags would require tightening and cutting eight thousand zip ties for the full set of 200 racks.